Figure 1

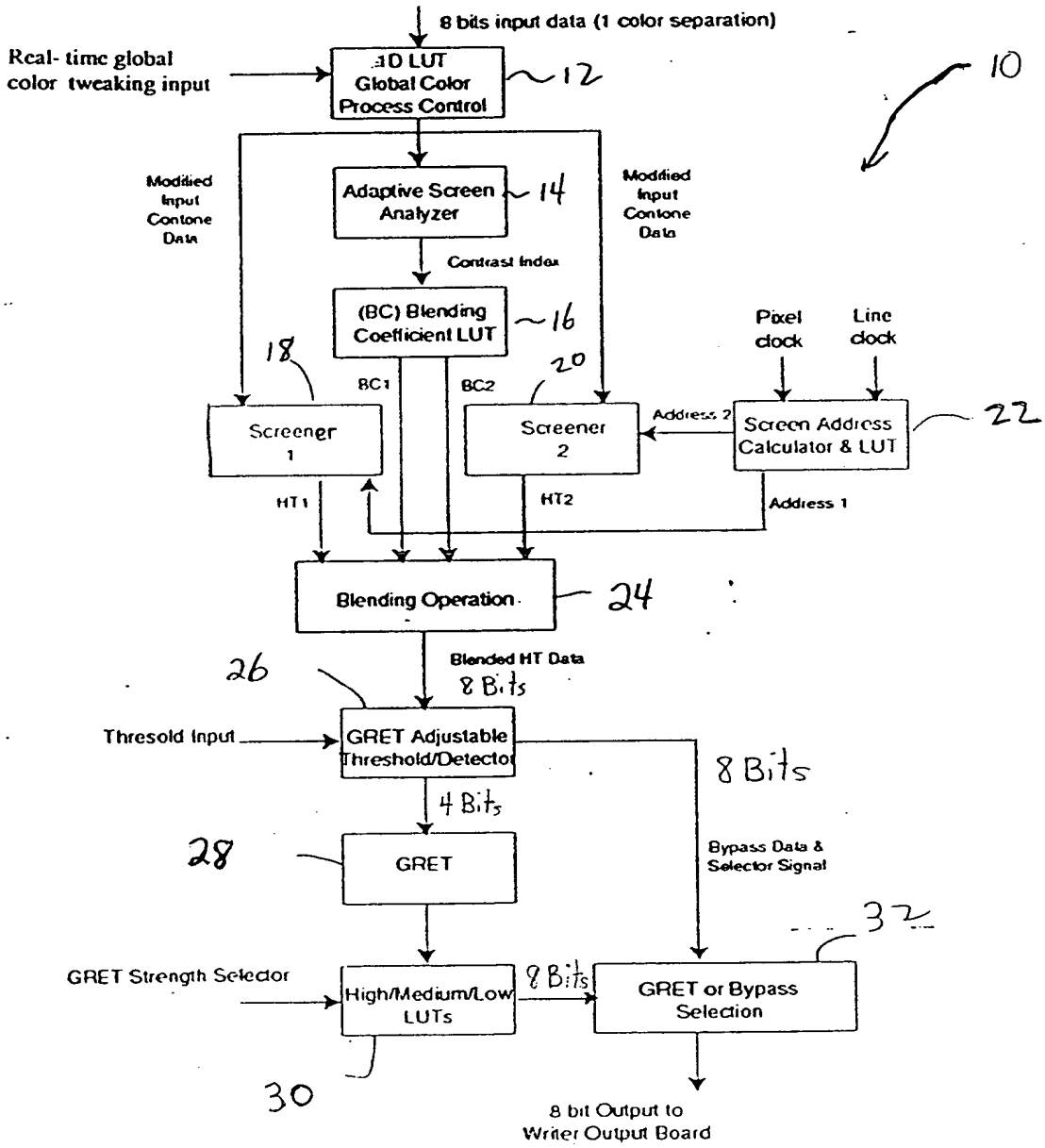
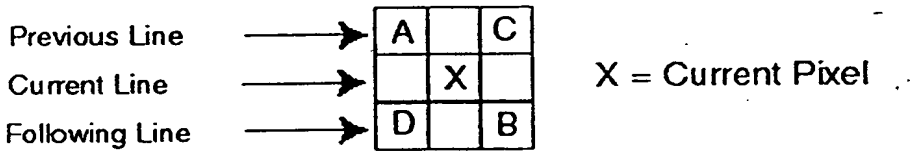
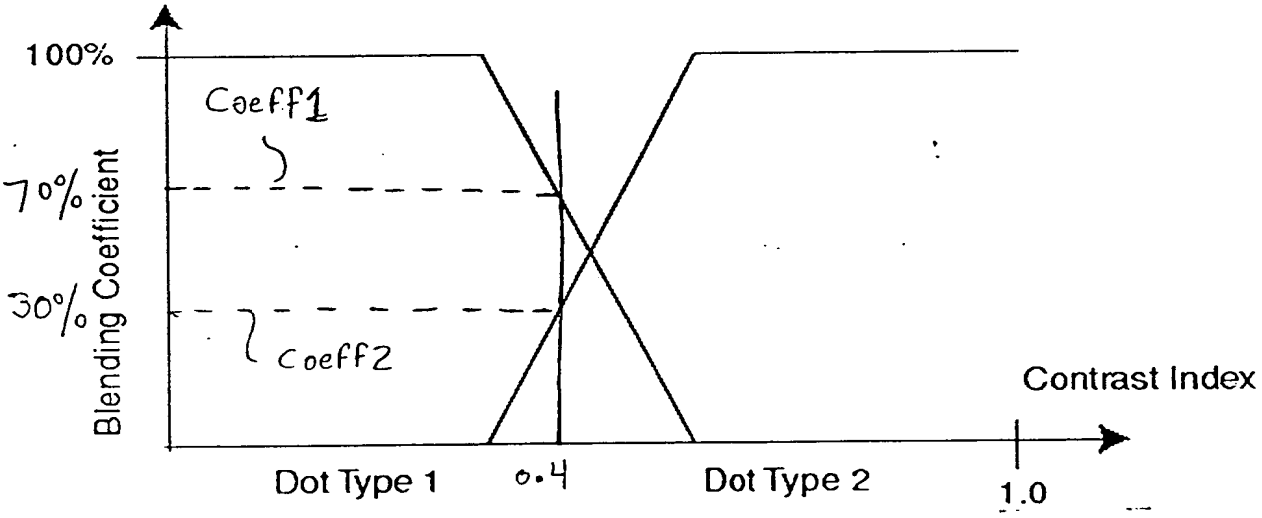

8 bits input data (1 color separation)
Real- time global color tweaking input
3D LUT Global Color Process Control
12
10
Modified Input Contone Data
Adaptive Screen Analyzer
14
Modified Input Contone Data
Contrast Index
(BC) Blending Coefficient LUT
16
Pixel clock
Line clock
18
BC1
BC2
20
Screener 1
Screener 2
Address 2
Screen Address Calculator & LUT
22
HT1
HT2
Address 1
Blending Operation
24
26
Blended HT Data
8 Bits
Thresold Input
GRET Adjustable Threshold/Detector
8 Bits
4 Bits
28
GRET
Bypass Data & Selector Signal
32
GRET Strength Selector
High/Medium/Low LUTs
8 Bits
GRET or Bypass Selection
30
8 bit Output to Writer Output Board

Figure 2



Contrast Index = Max (| A - B |, | C - D |)

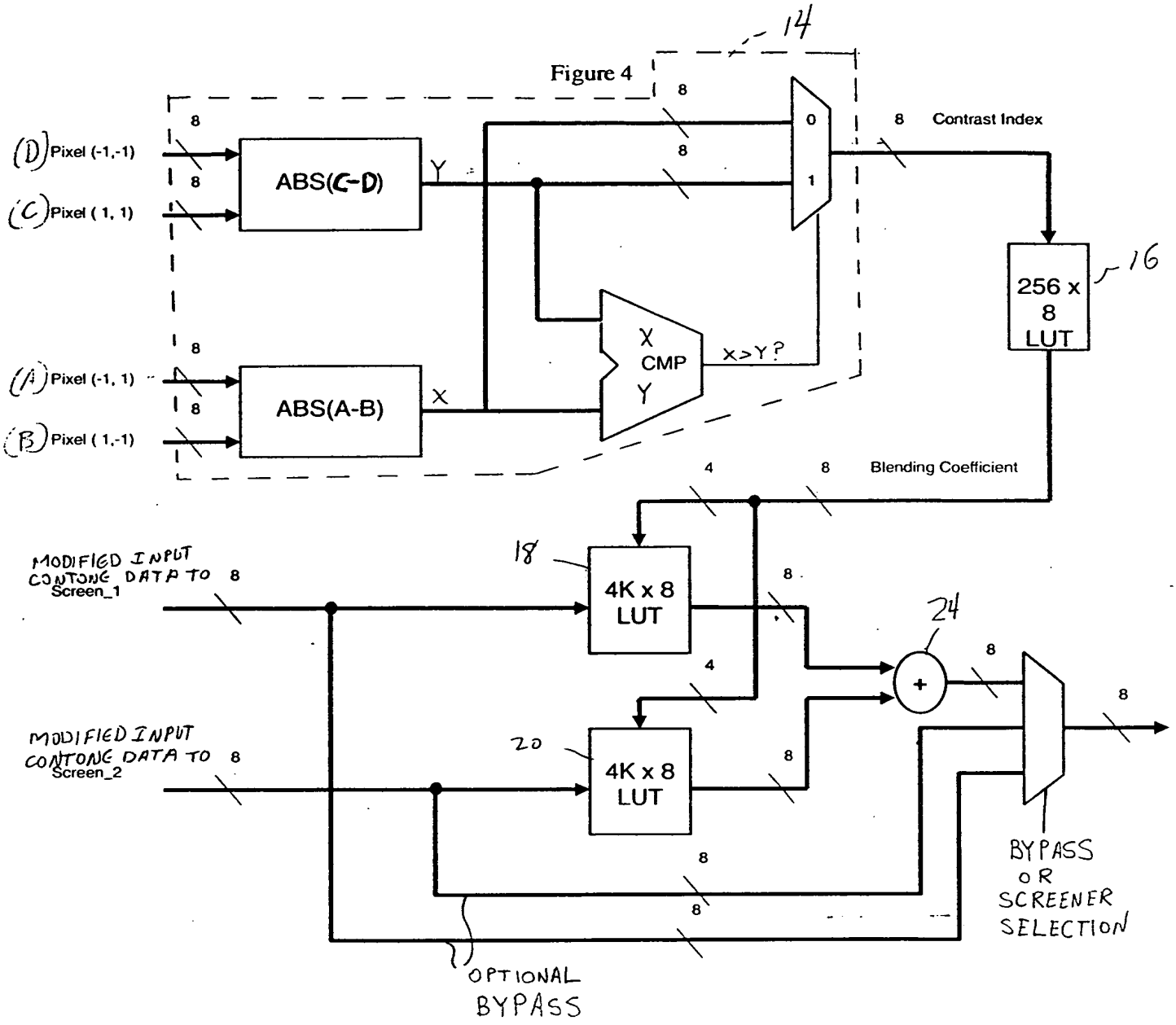
Figure 3



Rendered Dot Value = (Dot1_value) x Coeff1 + (Dot2_value) x Coeff2)

Coeff1 + Coeff2 = 1.0

Figure 4


14
(D) Pixel (-1,-1)
(C) Pixel (1, 1)
(A) Pixel (-1, 1)
(B) Pixel (1,-1)
8
ABS(C-D)
ABS(A-B)
Y
X
X CMP Y
X>Y?
0
1
8 Contrast Index
256 x 8 LUT
16
4
8 Blending Coefficient
MODIFIED INPUT CONTONE DATA TO Screen_1
MODIFIED INPUT CONTONE DATA TO Screen_2
18
4K x 8 LUT
20
4K x 8 LUT
24
+
BYPASS OR SCREENER SELECTION
OPTIONAL BYPASS

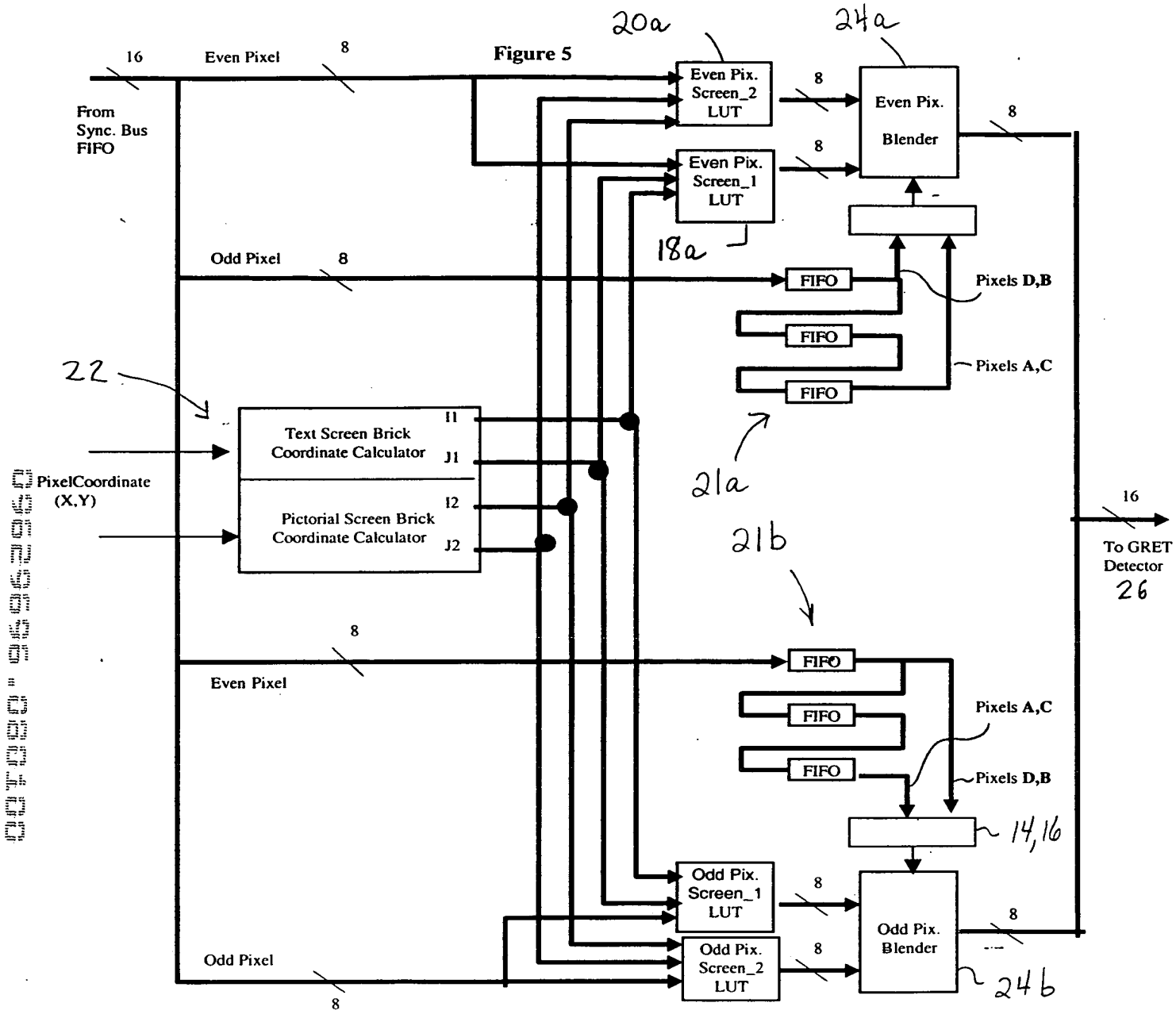

20a
24a
16
Even Pixel
8
From Sync. Bus FIFO
Even Pix. Screen_2 LUT
Even Pix. Screen_1 LUT
Even Pix. Blender
18a
Odd Pixel
FIFO
Pixels D,B
Pixels A,C
22
Text Screen Brick Coordinate Calculator
Pictorial Screen Brick Coordinate Calculator
I1
J1
I2
J2
PixelCoordinate (X,Y)
21a
21b
16
To GRET Detector
26
Even Pixel
Odd Pix. Screen_1 LUT
Odd Pix. Screen_2 LUT
Odd Pix. Blender
14,16
24b
Odd Pixel

Figure 5

Screen LUT Illustration

Plane = 255

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	255	255	255	255	0	0	0
2	0	0	0	0	0	0	0	0	255	255	255	255	255	255	255	255	0	0	0
3	0	0	0	0	255	255	255	255	255	255	255	255	255	255	255	255	0	0	0
4	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	0	0
5	0	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	0	0
6	0	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	0	0
7	0	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	0	0
8	0	0	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	0
9	0	0	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	0
10	0	0	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	0
11	0	0	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	0
12	0	0	0	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255
13	0	0	0	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255
14	0	0	0	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255
15	0	0	0	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255
16	0	0	0	0	255	255	255	255	255	255	255	255	255	255	255	255	0	0	0
17	0	0	0	0	255	255	255	255	255	255	255	255	0	0	0	0	0	0	0
18	0	0	0	0	255	255	255	255	0	0	0	0	0	0	0	0	0	0	0

Fig. 6(a)

Plane= 128

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	9	166	117	32	0	0	0
2	0	0	0	0	0	0	0	0	0	120	155	40	77	233	248	187	0	0	0
3	0	0	0	0	0	70	182	57	48	204	253	209	156	219	241	83	0	0	0
4	0	32	187	83	32	163	253	228	155	202	248	132	0	54	168	32	0	0	0
5	0	117	248	241	168	182	243	181	22	27	152	70	0	13	182	163	70	0	0
6	0	166	233	219	54	13	117	116	0	0	134	194	81	117	243	253	182	0	0
7	0	0	86	156	0	0	81	212	104	86	225	255	212	116	181	228	57	0	0
8	0	0	40	209	132	70	194	255	235	126	157	235	104	0	22	155	48	0	0
9	0	0	155	253	248	152	134	225	164	0	0	133	86	0	27	202	204	120	0
10	0	0	120	204	202	27	0	86	133	0	0	164	225	134	152	248	253	155	0
11	0	0	0	48	155	22	0	104	235	157	126	235	255	194	70	132	209	40	0
12	0	0	0	57	228	181	116	212	255	225	86	104	212	81	0	0	156	86	0
13	0	0	0	182	253	243	117	81	194	134	0	0	116	117	13	54	219	233	166
14	0	0	0	70	163	182	13	0	70	152	27	22	181	243	182	168	241	248	117
15	0	0	0	0	32	168	54	0	132	248	202	155	228	253	163	32	83	187	32
16	0	0	0	0	83	241	219	156	209	253	204	48	57	182	70	0	0	0	0
17	0	0	0	0	187	248	233	86	40	155	120	0	0	0	0	0	0	0	0
18	0	0	0	0	32	117	166	0	0	0	0	0	0	0	0	0	0	0	0

Fig. 6(b)

Plane= 2

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	12	34	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	47	0	0	11	30	0	0	0	0
4	0	0	0	0	0	0	36	11	0	0	42	0	0	0	0	0	0	0	0
5	0	0	24	23	0	0	32	10	0	0	0	0	0	0	0	0	0	0	0
6	0	0	22	20	0	0	0	0	0	0	0	0	0	0	18	51	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	68	0	0	5	14	0	0	0
8	0	0	0	0	0	0	0	52	16	0	0	19	0	0	0	0	0	0	0
9	0	0	0	35	33	0	0	15	4	0	0	0	0	0	0	0	0	0	0
10	0	0	0	10	9	0	0	0	0	0	0	0	0	0	0	24	64	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	88	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	67	21	0	0	0	0	0	0	0	0	0
13	0	0	0	0	45	42	0	0	0	0	0	0	0	0	0	0	6	18	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	17	46	0
15	0	0	0	0	0	0	0	0	0	19	6	0	0	63	0	0	0	0	0
16	0	0	0	0	0	12	12	0	0	49	15	0	0	0	0	0	0	0	0
17	0	0	0	0	0	33	31	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fig 6(c)

Example of 19x19 size of screen tile **(Screen ruling : 154.6 LPI Screen Angle : 14.93)**

1. Brick Width = 241 2. Brick Height = 1 3. Brick Offset = 177

Plane 255

255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255
255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255
255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255
255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255
255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255
255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255
255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	(255)	255	255	255	255	255	255	255	255	255	255	255
255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255
255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255

Fig. 7(a)

Plane 128

0	0	0	0	0	0	81	20	0	1	35	0	0	0	0	0	0	0	1	1	0	0	101	24	0	0	3
0	0	0	0	0	0	0	17	16	0	0	82	21	0	0	0	0	0	0	0	0	0	0	35	32	0	0
53	16	0	0	0	0	0	0	0	0	0	0	52	48	0	0	24	5	0	0	0	0	0	0	0	1	0
0	68	57	0	0	2	1	0	0	0	0	0	0	6	21	0	0	54	50	0	0	0	0	0	0	0	0
0	0	18	49	0	0	36	34	0	0	0	0	0	0	0	0	0	0	24	70	0	0	18	17	0	0	0
0	0	0	0	2	0	0	35	96	0	0	2	2	0	0	0	0	0	0	1	32	0	0	25	73	0	0
0	0	0	0	0	0	0	0	1	65	0	0	18	51	(0)	0	0	0	0	0	0	0	0	0	2	98	0
0	6	23	0	0	0	0	0	0	0	1	0	0	3	128	0	0	1	2	0	0	0	0	0	0	0	22
4	0	2	101	0	0	0	0	0	0	0	0	0	0	0	51	9	0	1	68	0	0	0	0	0		

Fig. 7(b)

Plane 2

0	0	0	0	0	0	51	14	0	1	23	0	0	0	0	0	0	0	1	1	0	0	65	18	0	0	3
0	0	0	0	0	0	0	11	10	0	0	52	15	0	0	0	0	0	0	0	0	0	0	23	20	0	0
35	10	0	0	0	0	0	0	0	0	0	0	34	30	0	0	18	5	0	0	0	0	0	0	0	1	0
0	44	39	0	0	2	1	0	0	0	0	0	0	6	15	0	0	36	32	0	0	0	0	0	0	0	0
0	0	12	31	0	0	24	22	0	0	0	0	0	0	0	0	0	0	18	46	0	0	12	11	0	0	0
0	0	0	0	2	0	0	23	60	0	0	2	2	0	0	0	0	0	0	1	20	0	0	19	49	0	0
0	0	0	0	0	0	0	0	1	41	0	0	12	33	(0)	0	0	0	0	0	0	0	0	0	2	62	0
0	6	17	0	0	0	0	0	0	0	1	0	0	3	80	0	0	1	2	0	0	0	0	0	0	0	16
4	0	2	65	0	0	0	0	0	0	0	0	0	0	0	33	9	0	1	44	0	0	0	0	0		

Fig. 7(c)

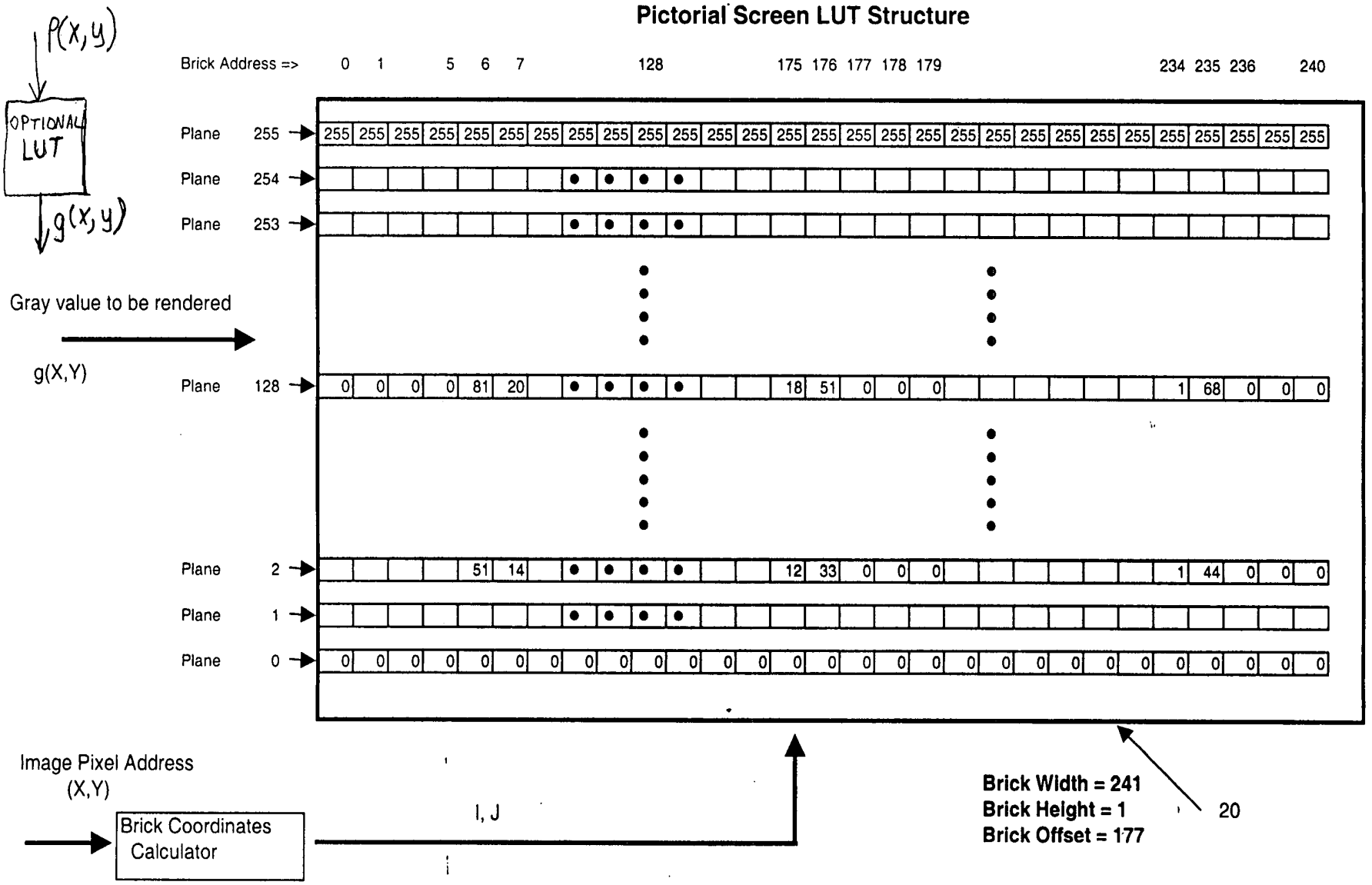

Pictorial Screen LUT Structure
P(X,Y)
OPTIONAL LUT
g(X,Y)
Gray value to be rendered
g(X,Y)
Brick Address => 0 1 5 6 7 128 175 176 177 178 179 234 235 236 240
Plane 255
Plane 254
Plane 253
Plane 128
Plane 2
Plane 1
Plane 0
Image Pixel Address (X,Y)
Brick Coordinates Calculator
I, J
Brick Width = 241
Brick Height = 1
Brick Offset = 177
20

Fig. 8

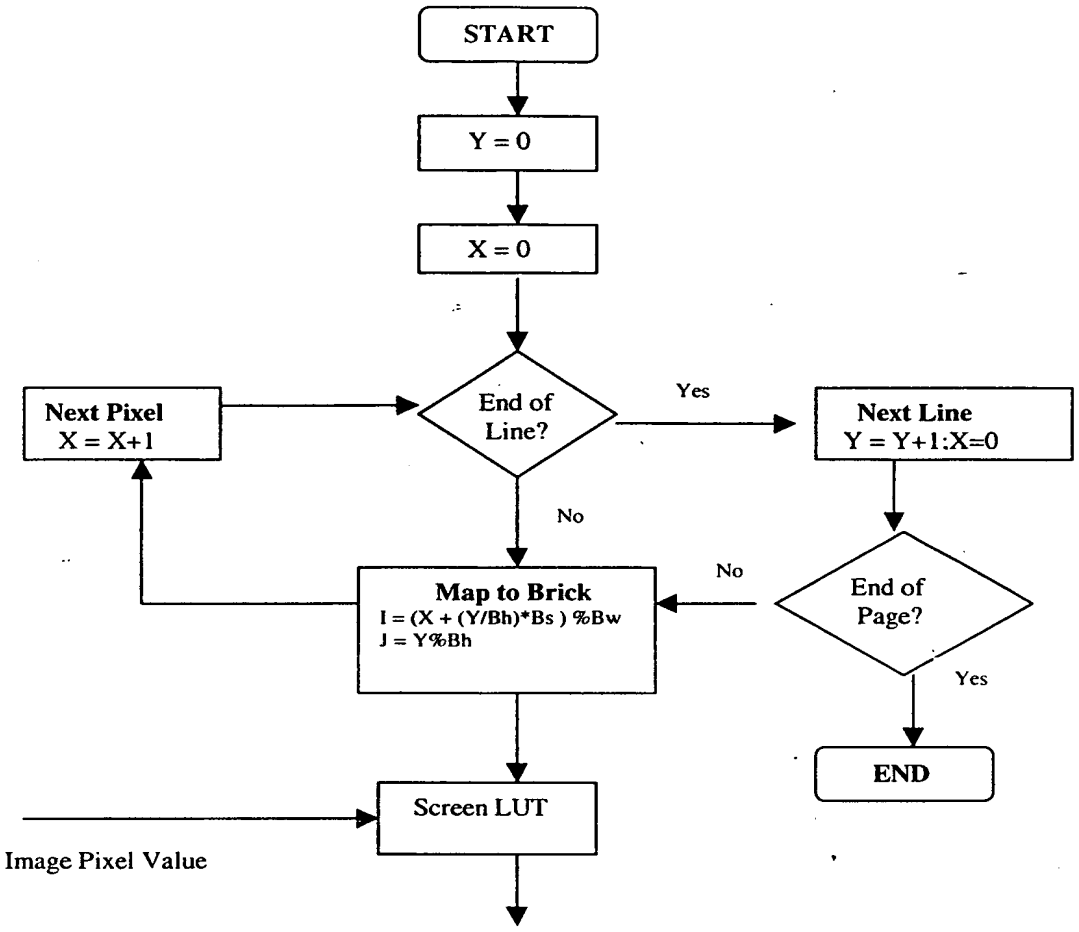


Figure: Screening Operation Flow Diagram
(X,Y: Image Pixel address; I,J: Brick address)
(Bw: Brick width; Bh: Brick height; Bs: Brick offset)

Fig. 9

Example of 2x2 size of Text screen tile (Screen ruling : 300 LPI Screen Angle : 0)

1. Brick Width = 2 2. Brick Height = 2 3. Brick Offset = 0

Plane 255

255	255
255	255

Plane 128

127	128
128	128

Plane 2

1	2
2	2

Fig. 10

Text Screen LUT Structure

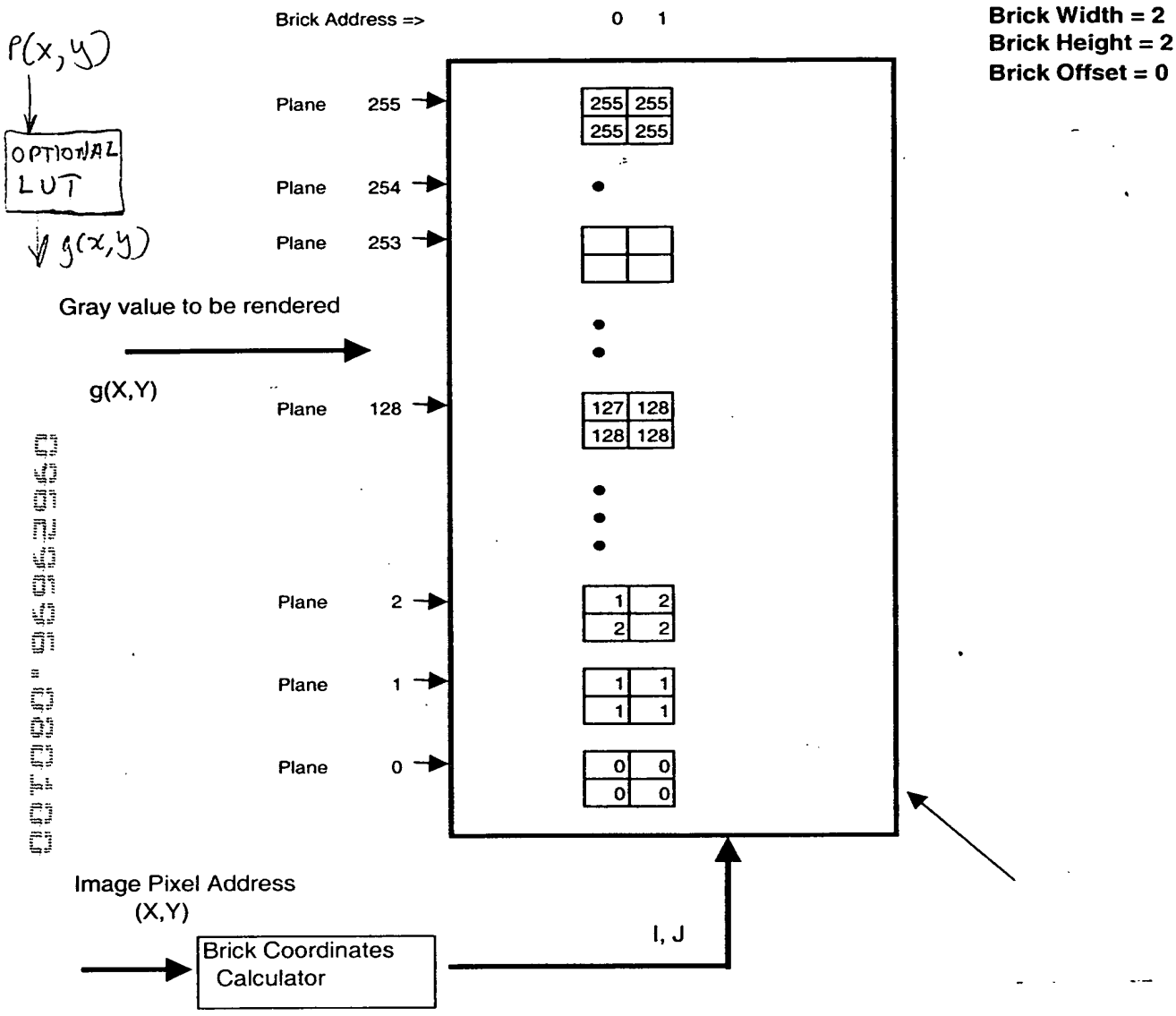


Fig. 11

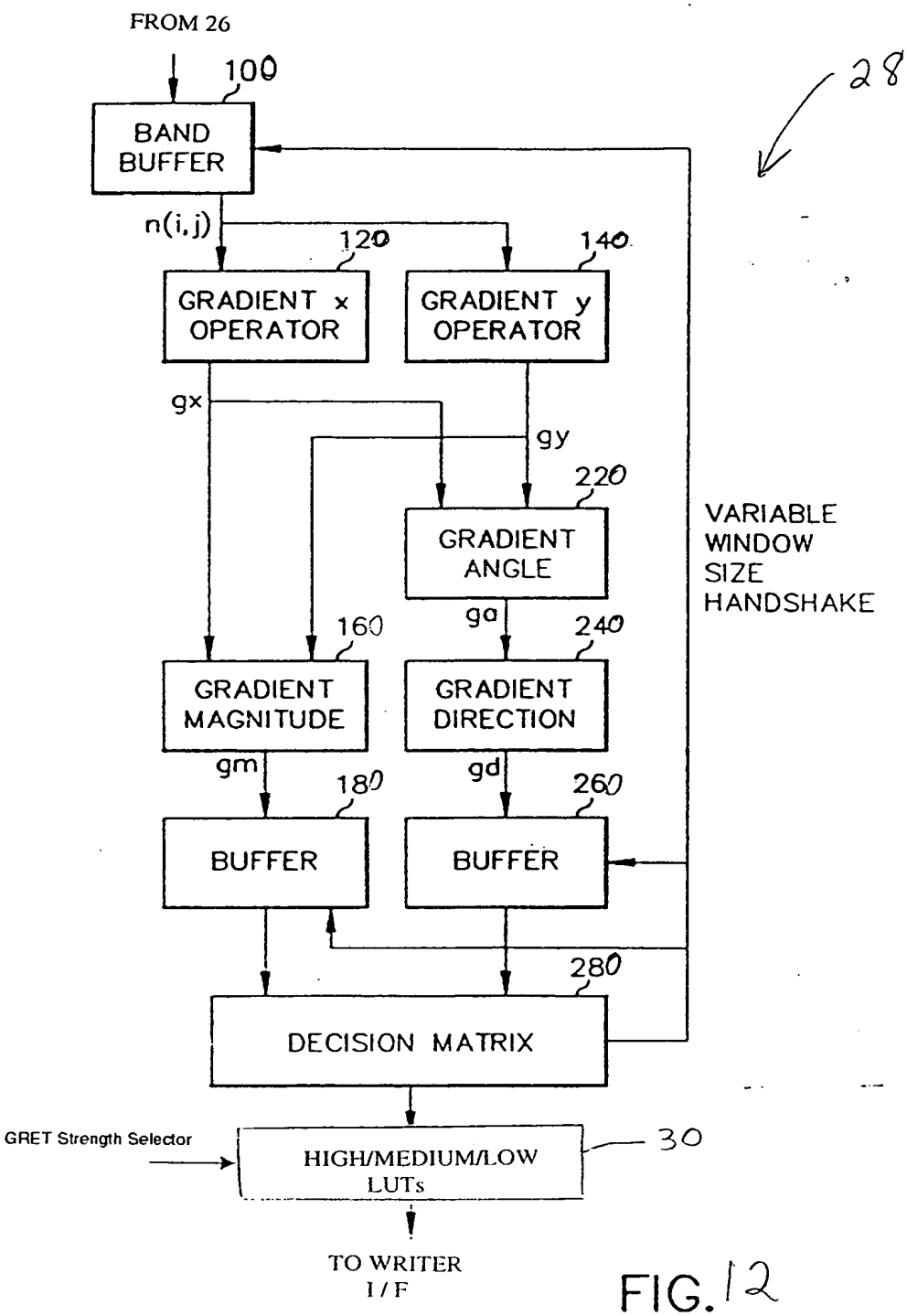

FROM 26
100
28
BAND BUFFER
n(i,j)
120
140
GRADIENT x OPERATOR
GRADIENT y OPERATOR
gx
gy
220
GRADIENT ANGLE
VARIABLE WINDOW SIZE HANDSHAKE
ga
160
240
GRADIENT MAGNITUDE
GRADIENT DIRECTION
gm
gd
180
260
BUFFER
BUFFER
280
DECISION MATRIX
GRET Strength Selector
HIGH/MEDIUM/LOW LUTs
30
TO WRITER I/F

FIG. 12

	Medium	High	Low
0	0	0	0
1	17	33	4
2	34	56	12
3	51	76	23
4	68	95	35
5	85	106	65
6	102	123	81
7	119	139	98
8	136	154	111
9	153	169	135
10	170	184	154
11	187	199	173
12	204	213	193
13	221	227	213
14	238	241	234
15	255	255	255

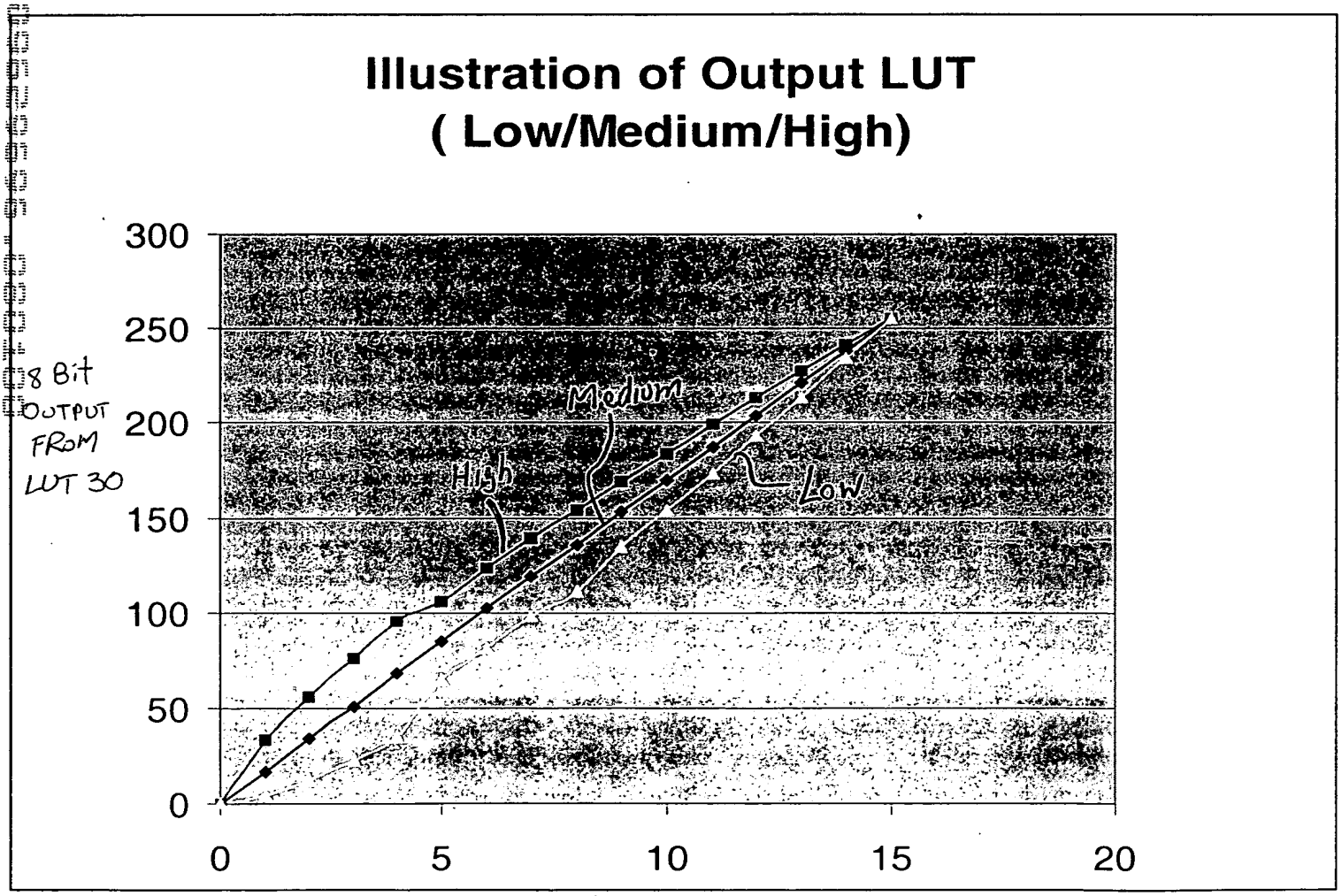


Fig. 13

Original Image

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	0	0	255	0	0	0	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	255	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	0	255	0	0	0	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	0	255	0	0	0	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	0	255	0	0	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	255	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	255	0	0	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	255	0	0	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	255	0	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	255	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	255	255	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	255	0	0	0	0	0	0	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	255	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	255	255	0	0	0	255	255	0	0	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0
0	0	255	0	0	255	0	0	0	0	255	0	0	0	0	0	0	0	0	0	255	255	255	0	0	0	0	0	0	0	0
0	0	255	0	255	255	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	255	0	0	0	255	255	0	0	0	0	0	0	255	255	255	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	255	0	0	255	255	0	0	0	0	0	255	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	255	0	0	255	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	255	0	255	255	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	255	255	255	0
0	0	255	0	255	0	255	0	0	0	255	255	255	0	0	0	0	0	0	0	0	0	255	255	255	255	255	0	0	0	0
0	0	255	0	255	0	255	0	255	255	255	0	0	0	0	0	0	0	0	255	255	255	255	0	0	0	0	0	0	0	0
0	0	255	0	255	255	255	255	255	0	0	0	0	0	0	255	255	255	255	255	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	255	0	0	0	0	0	0	0	255	255	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	255	255	255	255	255	255	255	255	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fig. 14

GRET Output with LUT: Medium strength

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	0	0	255	0	0	0	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	255	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	0	255	136	0	0	0	0	0	0	0	0	102	255	255	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	119	255	119	0	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	136	255	0	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	204	204	0	0	0	0	0	0	0	136	255	136	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	255	136	0	0	0	0	0	0	102	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	136	255	0	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	204	204	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	255	136	0	0	0	0	0	136	255	136	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	119	255	119	0	0	0	0	102	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	255	255	0	0
0	0	255	0	0	0	136	255	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0	136	255	255	0	0	0
0	0	255	0	0	0	204	204	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	255	255	255	0	0	0
0	0	255	0	0	0	255	136	0	0	0	136	255	136	0	0	0	0	0	0	0	0	0	0	0	136	255	255	136	0	0	0	0
0	0	255	0	0	136	255	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	255	255	255	0	0	0	0	0	0	0
0	0	255	0	0	204	204	0	0	0	255	255	0	0	0	0	0	0	0	0	136	255	255	136	0	0	0	0	0	0	0	0	0
0	0	255	0	136	255	136	0	0	136	255	136	0	0	0	0	0	0	0	0	255	255	255	0	0	0	0	0	0	0	0	0	0
0	0	255	0	204	204	0	0	102	255	255	0	0	0	0	0	0	136	255	255	136	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	255	136	0	0	255	255	0	0	0	0	0	136	204	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	255	0	0	255	255	0	0	0	0	0	255	255	204	136	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	255	0	136	255	136	0	0	0	0	255	255	136	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	255	0	204	204	0	0	0	136	255	255	102	0	0	0	0	0	0	0	0	0	0	119	136	204	255	255	0	0	0
0	0	255	0	255	0	255	0	0	136	204	255	255	0	0	0	0	0	0	0	0	136	204	255	255	255	204	136	0	0	0	0	0
0	0	255	0	255	0	255	0	255	255	204	136	0	0	0	0	0	119	136	204	255	255	204	136	119	0	0	0	0	0	0	0	0
0	0	255	0	255	255	255	255	255	136	0	0	0	0	136	204	255	255	255	204	136	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	255	0	0	0	0	0	0	136	204	255	255	204	136	119	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	255	255	255	255	255	255	255	255	255	204	136	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fig. 15

GRET Output with LUT: Low strength

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	0	0	255	0	0	0	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	255	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	0	255	116	0	0	0	0	0	0	0	0	81	255	255	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	98	255	98	0	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	116	255	0	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	193	193	0	0	0	0	0	0	0	0	116	255	116	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	255	116	0	0	0	0	0	0	0	81	255	255	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	116	255	0	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	193	193	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	255	116	0	0	0	0	0	0	116	255	116	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	98	255	98	0	0	0	0	81	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	255	255	0	0
0	0	255	0	0	0	116	255	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	116	255	255	0	0	0
0	0	255	0	0	0	193	193	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	255	255	255	0	0	0	0
0	0	255	0	0	0	255	116	0	0	0	116	255	116	0	0	0	0	0	0	0	0	0	0	116	255	255	116	0	0	0	0	0	0
0	0	255	0	0	116	255	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	255	255	255	0	0	0	0	0	0	0
0	0	255	0	0	193	193	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0	116	255	255	116	0	0	0	0	0
0	0	255	0	116	255	116	0	0	116	255	116	0	0	0	0	0	0	0	255	255	255	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	193	193	0	0	81	255	255	0	0	0	0	0	0	116	255	255	116	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	255	116	0	0	255	255	0	0	0	0	0	116	193	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	255	0	0	255	255	0	0	0	0	0	255	255	193	116	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	255	0	116	255	116	0	0	0	0	255	255	116	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	255	0	193	193	0	0	0	116	255	255	81	0	0	0	0	0	0	0	0	0	0	98	116	193	255	255	0	0	0	0
0	0	255	0	255	0	255	0	0	116	193	255	255	0	0	0	0	0	0	0	0	116	193	255	255	255	193	116	0	0	0	0	0	0
0	0	255	0	255	0	255	0	255	255	193	116	0	0	0	0	0	98	116	193	255	255	193	116	98	0	0	0	0	0	0	0	0	0
0	0	255	0	255	255	255	255	255	116	0	0	0	0	116	193	255	255	255	193	116	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	255	0	0	0	0	0	0	116	193	255	255	193	116	98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	255	255	255	255	255	255	255	255	255	193	116	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fig. 16

GRET Output with LUT: High strength

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	0	0	255	0	0	0	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	255	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	0	255	154	0	0	0	0	0	0	0	0	123	255	255	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	139	255	139	0	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	154	255	0	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	213	213	0	0	0	0	0	0	0	154	255	154	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	255	154	0	0	0	0	0	0	123	255	255	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	154	255	0	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	213	213	0	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	255	154	0	0	0	0	0	154	255	154	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	139	255	139	0	0	0	0	123	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	255	255	0	0
0	0	255	0	0	0	154	255	0	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	154	255	255	0	0
0	0	255	0	0	0	213	213	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	255	255	255	0	0	0
0	0	255	0	0	0	255	154	0	0	0	154	255	154	0	0	0	0	0	0	0	0	0	0	154	255	255	154	0	0	0	0	0
0	0	255	0	0	154	255	0	0	0	0	255	255	0	0	0	0	0	0	0	0	0	255	255	255	0	0	0	0	0	0	0	0
0	0	255	0	0	213	213	0	0	0	0	154	255	154	0	0	0	0	0	0	0	0	154	255	255	154	0	0	0	0	0	0	0
0	0	255	0	213	213	0	0	123	255	255	0	0	0	0	0	0	154	255	255	154	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	255	154	0	0	255	255	0	0	0	0	0	154	213	255	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	255	0	0	255	255	0	0	0	0	0	255	255	213	154	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	255	0	154	255	154	0	0	0	0	255	255	154	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	255	0	213	213	0	0	0	154	255	255	123	0	0	0	0	0	0	0	0	0	0	139	154	213	255	255	0	0	0
0	0	255	0	255	0	255	0	0	154	213	255	255	0	0	0	0	0	0	0	0	154	213	255	255	255	213	154	0	0	0	0	0
0	0	255	0	255	0	255	0	255	255	213	154	0	0	0	0	0	139	154	213	255	255	213	154	139	0	0	0	0	0	0	0	0
0	0	255	0	255	255	255	255	255	154	0	0	0	0	154	213	255	255	255	213	154	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	255	0	0	0	0	0	0	154	213	255	255	213	154	139	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	255	255	255	255	255	255	255	255	255	213	154	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fig. 17

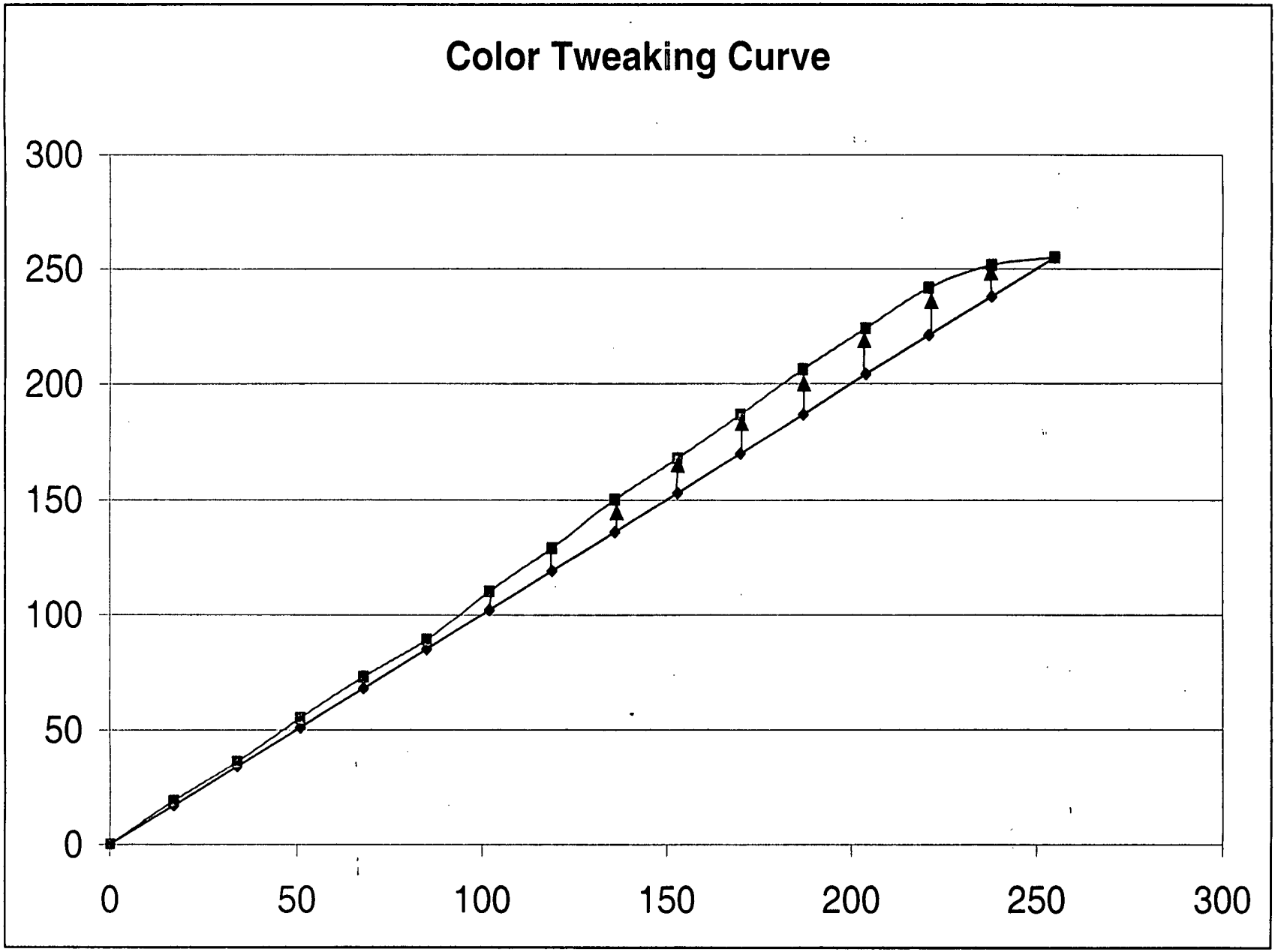

Color Tweaking Curve
300
250
200
150
100
50
0
0
50
100
150
200
250
300
GRAY LEVEL OUT
Gray Level In

Fig. 18

08/09/96 96629650

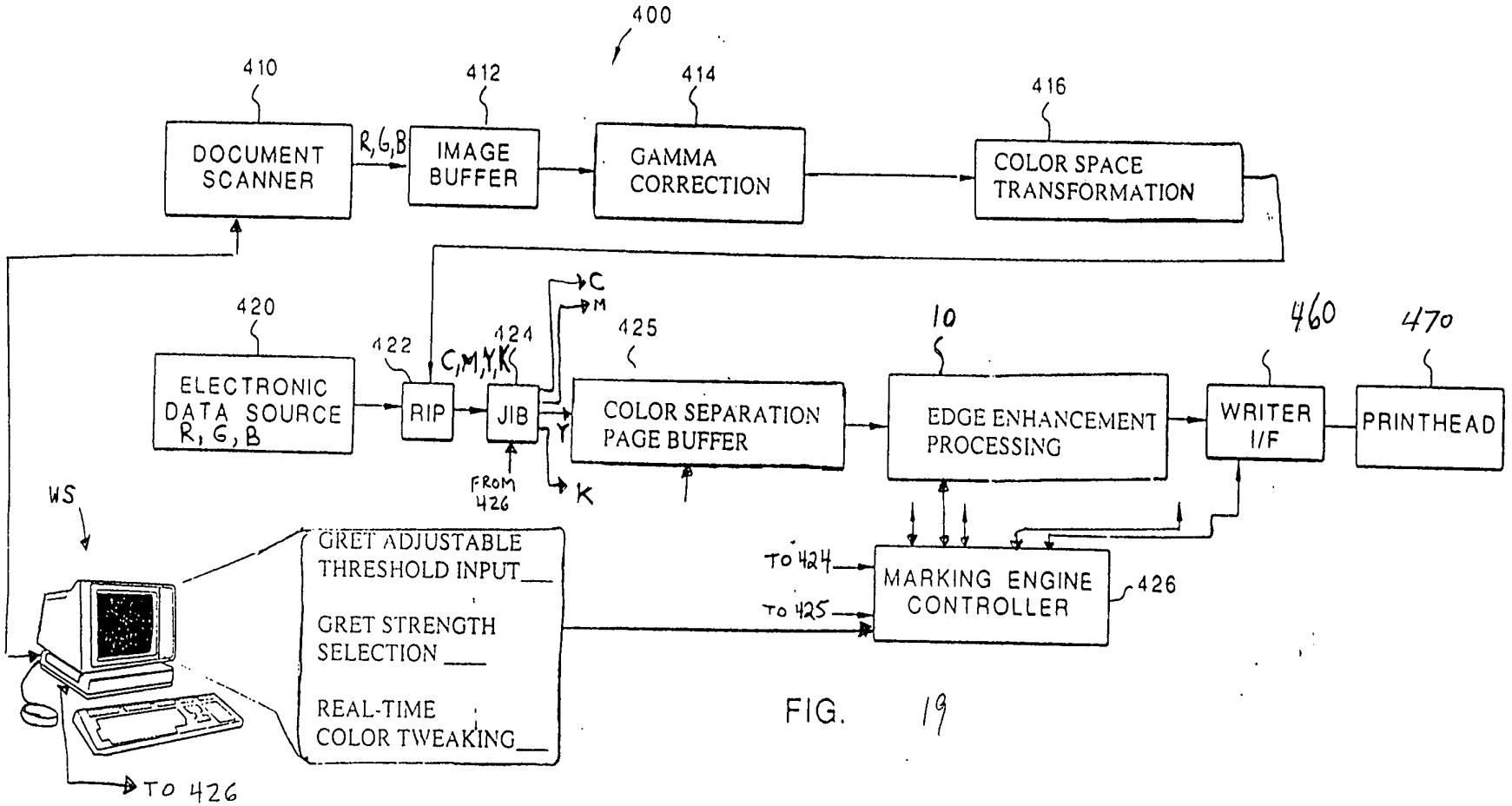


FIG. 19

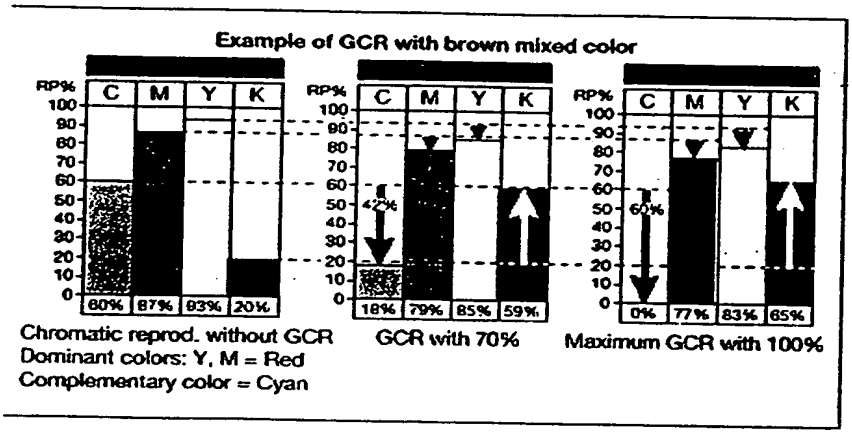


Fig. 20(a)

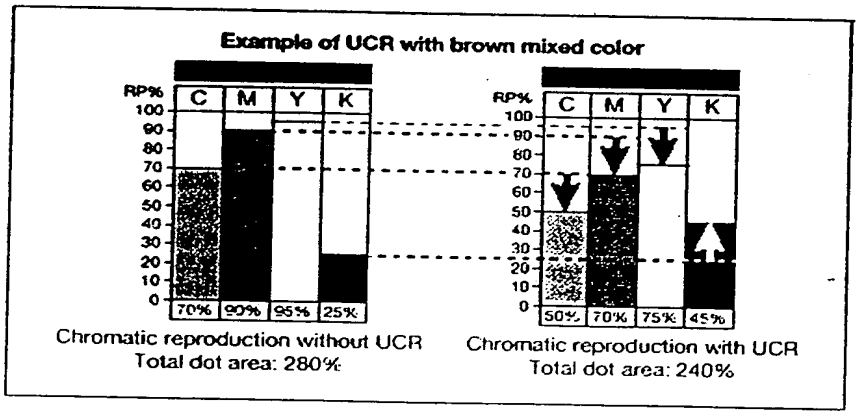


Fig. 20(b)

Illustration of tile structure and brick structure

Screen example: 141 LPI@600 dpi, 45 degree

Step1: **Tile structure**

x	x	x	x	x	x	x
x	x	x	C1	x	x	x
x	x	C1	C1	C1	x	x
x	C1	C1	C1	C1	C1	x
x	C1	C1	C1	C1	C1	x
x	x	C1	C1	C1	x	x
x	x	x	C1	x	x	x
x	x	x	0	x	x	x

Fig. 21-1

Screen Tile Information:

1. **Single cell C1 with one tile**
2. **Screen Angle = 45 degree**
3. **Screen ruling = 141 LPI @ 600dpi**

Step2: **Label pixel sequence in the tile**

0	0	0	0	0	0	0
0	0	0	1	0	0	0
0	0	2	3	4	0	0
0	5	6	7	8	9	0
0	10	11	12	13	14	0
0	0	15	16	17	0	0
0	0	0	18	0	0	0
0	0	0	0	0	0	0

Fig. 21-2

Step3: **Fill up image Plane with tile**

1	10	11	12	13	14	1	10	11	12	13	14	1
3	4	15	16	17	2	3	4	15	16	17	2	3
7	8	9	18	5	6	7	8	9	18	5	6	7
12	13	14	1	10	11	12	13	14	1	10	11	12
16	17	2	3	4	15	16	17	2	3	4	15	16
18	5	6	7	8	9	18	5	6	7	8	9	18
1	10	11	12	13	14	1	10	11	12	13	14	1
3	4	15	16	17	2	3	4	15	16	17	2	3
7	8	9	18	5	6	7	8	9	18	5	6	7
12	13	14	1	10	11	12	13	14	1	10	11	12
16	17	2	3	4	15	16	17	2	3	4	15	16
18	5	6	7	8	9	18	5	6	7	8	9	18
1	10	11	12	13	14	1	10	11	12	13	14	1
3	4	15	16	17	2	3	4	15	16	17	2	3
7	8	9	18	5	6	7	8	9	18	5	6	7
12	13	14	1	10	11	12	13	14	1	10	11	12
16	17	2	3	4	15	16	17	2	3	4	15	16

Fig. 21-3

6,903,845

Step 4: **Found repeating rectangle blocks in the image plane**

1	10	11	12	13	14	1	10	11	12	13	14	1
3	4	15	16	17	2	3	4	15	16	17	2	3
7	8	9	18	5	6	7	8	9	18	5	6	7
12	13	14	1	10	11	12	13	14	1	10	11	12
16	17	2	3	4	15	16	17	2	3	4	15	16
18	5	6	7	8	9	18	5	6	7	8	9	18
1	10	11	12	13	14	1	10	11	12	13	14	1
3	4	15	16	17	2	3	4	15	16	17	2	3
7	8	9	18	5	6	7	8	9	18	5	6	7
12	13	14	1	10	11	12	13	14	1	10	11	12
16	17	2	3	4	15	16	17	2	3	4	15	16
18	5	6	7	8	9	18	5	6	7	8	9	18
1	10	11	12	13	14	1	10	11	12	13	14	1
3	4	15	16	17	2	3	4	15	16	17	2	3
7	8	9	18	5	6	7	8	9	18	5	6	7
12	13	14	1	10	11	12	13	14	1	10	11	12
16	17	2	3	4	15	16	17	2	3	4	15	16

Fig. 21-4

Step 5: **Brick structure formed**

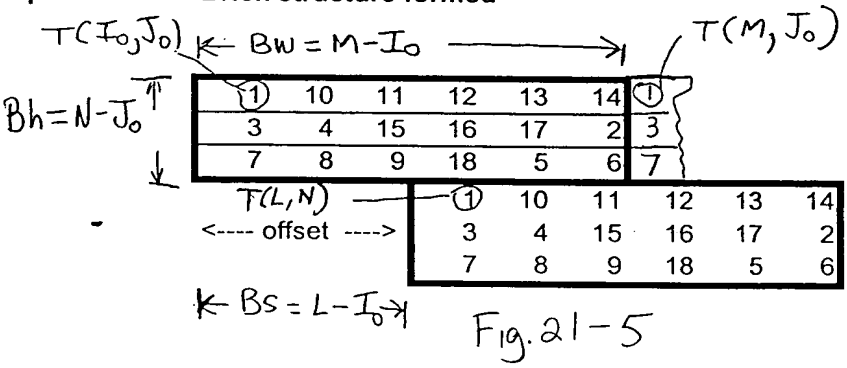


Fig. 21-5

Brick information

1. Brick width = 6 = Bw
2. Brick Height = 3 = Bh
3. Brick Offset = 3 = Bs

Step 6: Converts 3-D LUT structure to 3-D LUT Brick strucuture

Level 0

Level 2

106	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Level 128

255	231	0	0	0	231
255	231	0	0	0	231
220	99	99	220	100	100

Level 255

255	255	255	255	255	255
255	255	255	255	255	255
255	255	255	255	255	255

Fig. 21-6

Flow chart to construct Brick

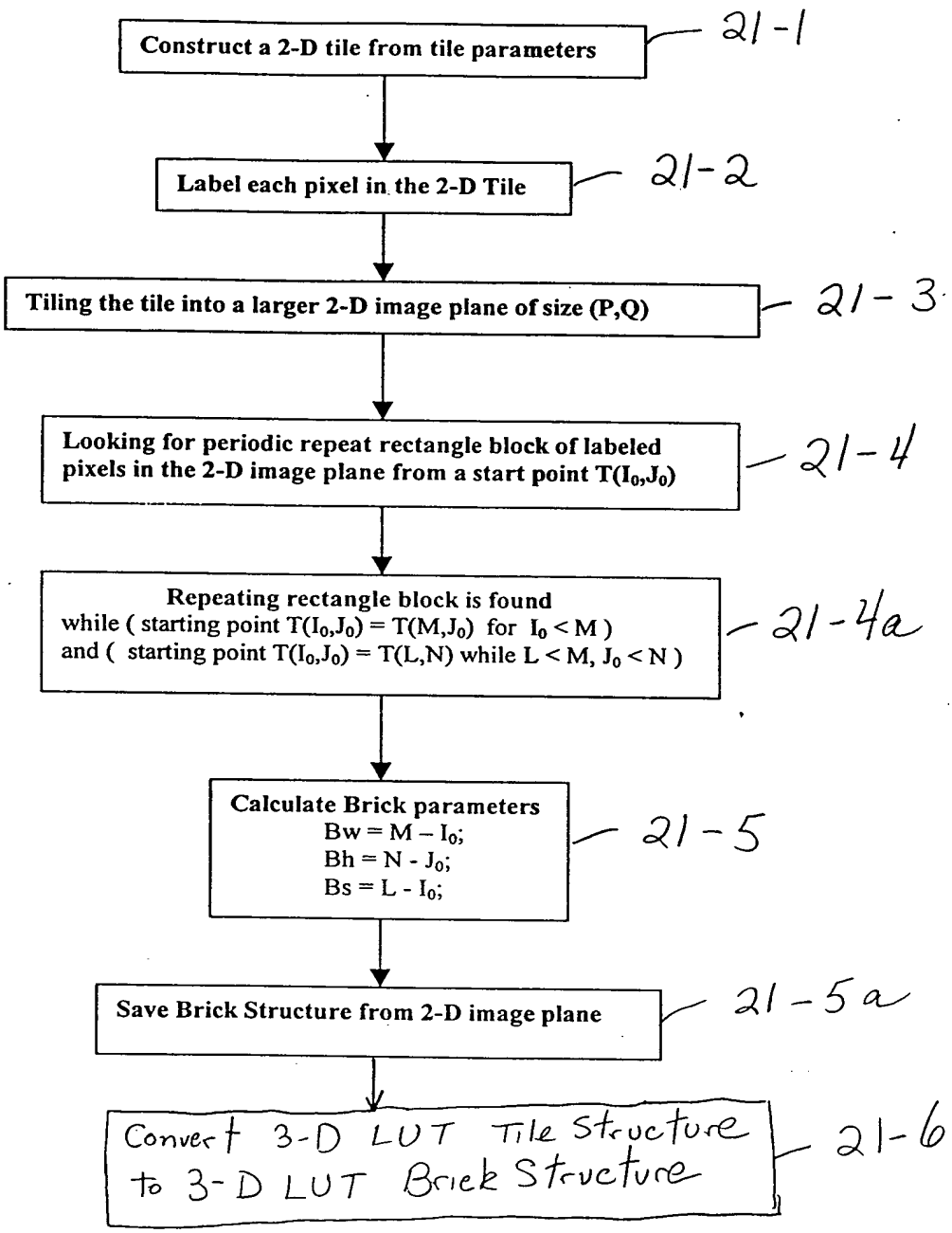
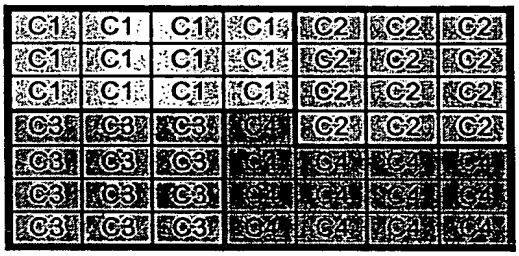


Fig. 22

Screen #2: 171 lpi, 0 degree

Tile structure



Screen Information:

1. Four cells (C1,C2,C3,C4) with one tile
2. Each cell has different shapes
3. Different cell sizes among cells
4. Screen Angle = 0 degree
5. Screen ruling = 171 LPI @ 600dpi
6. Brick width = 7
7. Brick Height = 7
8. Brick Offset = 0

Dot type choices:
(full,partial, mixed, distributed dot type)

Brick structure

S1	E1	S1	E1
S2	E2	S2	E2
S3	E3	S3	E3
S4	E4	S4	E4
S5	E5	S5	E5
S6	E6	S6	E6
S7	E7	S7	E7
S1	E1	S1	E1
S2	E2	S2	E2
S3	E3	S3	E3
S4	E4	S4	E4
S5	E5	S5	E5
S6	E6	S6	E6
S7	E7	S7	E7

S1,S2,..S7 : start of brick pixel

E1,E2,..E7: end of brick pixel

Fig. 23(a)

Screen #2: 171 lpi, 0 degree

Gray level = 2

Dot type: distributed dot type

0	0	0	0	0	0	0
0	31	18	0	7	42	0
0	15	8	0	3	20	0
0	0	0	0	0	0	0
0	8	5	0	2	11	0
0	38	21	0	8	51	0
0	0	0	0	0	0	0

Brick structure

1. Brick width = 7
2. Brick Height = 7
3. Brick Offset = 0

0	0	0	0	0	0	0
0	31	18	0	7	42	0
0	15	8	0	3	20	0
0	0	0	0	0	0	0
0	8	5	0	2	11	0
0	38	21	0	8	51	0
0	0	0	0	0	0	0

Fig. 23(b)

Screen #2: 171 lpi, 0 degree

Gray level = 128

Dot type: distributed dot type

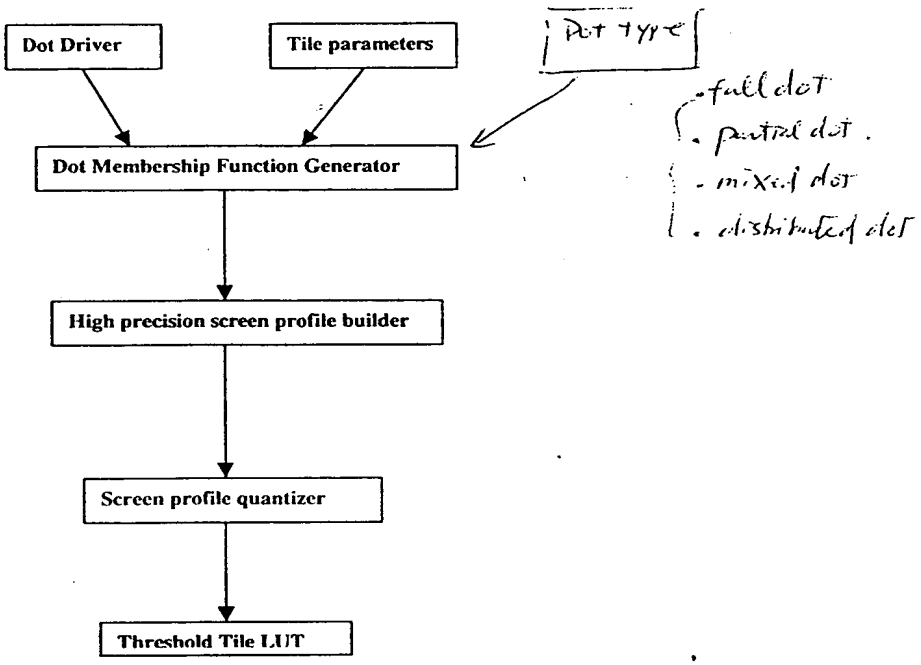
20	164	83	5	83	164	20
164	255	229	132	223	255	164
83	229	163	51	159	233	83
5	132	51	0	51	132	5
83	223	159	51	158	224	83
164	255	233	132	224	255	164
20	164	83	5	83	164	20

Brick structure

1. Brick width = 7
2. Brick Height = 7
3. Brick Offset = 0

Fig. 23(c)

Flow Chart to Construct a Threshold LUT of a Tile



16x16 dot size Driver

256	245	240	224	204	168	136	92	85	129	161	195	219	233	250	255
252	244	232	208	188	160	116	84	73	109	153	181	209	229	241	248
236	228	216	192	176	144	108	80	69	101	137	169	197	213	225	237
217	212	200	180	152	120	100	63	55	93	121	145	177	189	205	221
193	184	172	148	128	58	46	39	35	51	67	125	149	173	185	201
164	156	140	124	66	42	30	22	19	31	43	59	117	141	157	165
132	112	104	96	50	26	14	6	11	15	27	47	97	105	113	133
88	76	72	54	34	18	10	4	3	8	23	37	61	77	81	89
90	82	78	62	38	24	7	2	1	12	17	33	53	70	74	87
134	114	106	98	48	28	16	9	5	13	25	49	95	103	111	131
166	158	142	118	60	44	32	20	21	29	41	65	123	139	155	163
202	186	174	150	126	68	52	36	40	45	57	127	147	171	183	194
222	206	190	178	146	122	94	56	64	99	119	151	179	199	211	218
238	226	214	198	170	138	102	71	79	107	143	175	191	215	227	235
246	242	230	210	182	154	110	75	83	115	159	187	207	231	243	251
254	249	234	220	196	162	130	86	91	135	167	203	223	239	247	253

Fig. 24